



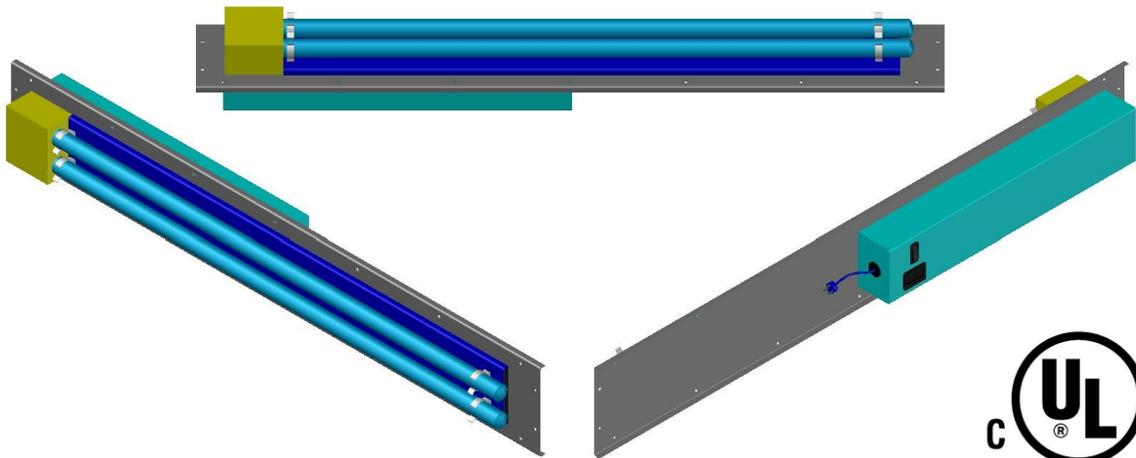
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## Ductotron UL 1995 UL 2043



MADE IN CANADA

### INSTALLATION OPERATION MANUAL

Aug 26 / 2020

**UV—Radiation    Protect Eyes and Skin**

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### Ductotron:

Input Voltage: **120 VAC, 1 Ph, 60 Hz — CANADA/USA**

Current : 0.75 Amps (2- 425mA lamps) Model 4

Current : 1.5 Amps (2- 800mA lamps) **Model 8**

**220 VAC, 1 Ph, 50 Hz — Overseas**

Current : 0.4 Amps (2- 425mA lamps) Model 4

Current : 0.8 Amps (2- 800mA lamps) **Model 8**

Construction: Aluminum / Galvanized

Glass: Quartz

Reflector: Total Reflectivity 92% Specular Mirror finish

Lamp Type: UV-C, rated lamp life 9000-16000 hrs

Lamp: Qty 2 each— 425mA or 800 mA

Ballast: Electronic

Hour Meter : Electronic LCD (hours & 1/10's)

Circuit Breaker: Rocker-Actuated Thermal Circuit Breaker/Power Switch

Plug: Light-N-LOK 3 pos mated pair (18AWG solid Wire Poke-In)

Individual components on Ductotron are UL Recognized and is UL approved for UL 1995 and UL2043



## SAFETY PRECAUTIONS

1. **WARNING:** Eye damage may result from directly viewing the light produced by the lamp(s) in this apparatus. Always disconnect all power before servicing.

AVERTISSEMENT: les dommages des yeux peut résulter de regarder directement la lumière produite par la lampe (s) dans cet appareil. Toujours couper l'alimentation avant l'entretien.

Note: This marking is to also be included inside the package to be affixed to any access panel or door to warn personnel that UV equipment is installed.

2. **WARNING: RISK OF ELECTRIC SHOCK. CAN CAUSE INJURY OR DEATH: DISCONNECT ALL REMOTE ELECTRIC POWER SUPPLIES BEFORE SERVICING.**

WARNING: RISQUE DE CHOC ÉLECTRIQUE. PEUT PROVOQUER DES BLESSURES OU LA MORT: COUPER TOUS ALIMENTATIONS ÉLECTRIQUES À DISTANCE AVANT SERVICING.

3. Disclaimer Marking – The health aspects associated with the use of this product and its ability to aid in disinfection of environment air have not been investigated by UL.”

4. “USE ONLY TYPE T5, ----Wattage(+) LAMPS.”

**(+) – Marked lamp wattage should match lamp and ballast wattage ratings described in Figure 1, items 6 and 12**

5. “SUITABLE FOR AIR-HANDLING USE”

6. “MIN 90°C SUPPLY CONDUCTORS”

7. "USE COPPER CONDUCTORS ONLY"

8. "Max. Operating Temperature - 40C

Special Note: The above disclaimers are to be included in all marketing materials for this product that mention or reference UL Classification.

**UV—Radiation Protect Eyes and Skin**

## SAFETY PRECAUTIONS

### **WARNING:**

The electrical supply circuit connected to this UV appliance must be routed through an electrical interlock switch placed on the HVAC system duct access panels and doors to prevent accidental UV exposure when servicing the air ducts or equipment” or equivalent.

“Interlock shall break all supply conductors.

Interlocks should not be tampered with and should be replaced or repaired when defective

### **ATTENTION:**

Le circuit d'alimentation électrique relié à cet appareil UV doit être acheminés par un interrupteur de verrouillage électrique placé sur le système de CVC panneaux et portes d'accès conduits pour éviter une exposition accidentelle aux UV lorsque l'entretien des conduits d'air ou de l'équipement "ou équivalent.

"Interlock brisera tous les conducteurs d'alimentation.

Les verrouillages ne doivent pas être altérés et doivent être remplacés ou réparés s'ils sont défectueux.

### **CAUTION:**

Equipment Damage Hazard. Ultraviolet light can cause color shift or surface degradation and sometimes structural degradation of non-metallic components. Select mounting location that prevents exposure to plastic flexible duct components, polyurethane foam insulation material, rubber hoses, wire insulation, etc. If mounting options are limited, items above should be protected with ultraviolet resistant material such as aluminum foil, aluminum duct tape, or metallic shields or the equivalent.

### **PRUDENCE:**

Risque de dommage matériel. La lumière ultraviolette peut causer des changement de couleur ou dégradation de la surface et de la dégradation parfois structurelle de non-métallique Composants. Sélectionnez l'emplacement de montage qui empêche l'exposition au plastique Composants de gaine en polyuréthane souple, matériau d'isolation en mousse, tuyaux en caoutchouc, isolation des fils, etc. Si les options de montage sont limitées, éléments ci-dessus doivent être protégés par un matériau résistant à l'ultraviolet telle u'une feuille d'aluminium, ruban d'aluminium, ou boucliers métalliques ou équivalent.

## CONTROLS

### ***Controls***

There are three types of control measures: engineering, administrative (procedural), and personal protective equipment (PPE).

### ***Engineering Controls***

#### ***Location***

**Do not installed UV light assembly in an AHU enclosure employing non-metallic parts/components including non-metallic drain pan and located so there are no openings in the AHU enclosure along the line of "sight" of the Ductrotron unit.**

See typical installation of Ductrotron on page 8 Fig:1 **For Indoor** Duct Mount.

**For outdoor** : Consult factory for weather proof installation instructions.

1. UVGI devices may be installed upstream, downstream, or on all sides of the duct to inactivate microbes, although downstream installation tends to be preferred .(Supply Air Plenum)
2. Should be easily accessible and allow enough clearance for routine cleaning or maintenance.
3. Prevent exposure of any plastic, rubber or other non-metallic materials, with inadequate resistance to ultraviolet, such as; plastic drain pans, wiring insulation, flex ducts, humidifiers, filters etc. If necessary, shield all plastic, rubber or other non-metallic materials using aluminum tape, conduit, sheet metal or equivalent ultraviolet resistant material.
4. Do not mount near any duct openings, joints, seams, etc. If necessary, seal all openings, joints, seams, etc. using aluminum tape or equivalent ultraviolet resistant material. Joints less then 45"(1143mm) is not recommended. UVC warning label is required to alert operator during routine maintenance within the distance from the unit ( Ductrotron). See limitation of exposure page 6

**Proper unit placement is essential. To ensure safe and effective operation, the location should:**

5. Have enough duct length to mount unit with lamps parallel to airflow, within the longest duct length for increased exposure time. *Consult factory for proper selection or placement of unit ,location, engineering drawing, etc; case by case.*
6. Be able to support the weight of the unit (3KG / 6.6 LBS ). If the duct construction does not seem capable of supporting the unit, the duct must be re-enforced, to support the weight, before installing.

**Ensure straight duct requirement for parallel installation vertically or horizontally.**

7. Duct cut out template for each unit is factory provided. Outside dimensions 40.5"L x 7."H (1028.7mm L x 177.8 mm H), inside cut-out 37.25"L x 3.875" H (946.15mm L x 984.25mm H). This is part of the installation which will be permanently affixed on the duct. Straight duct length required for installation is 48" (1219 mm), minimum with no joints, but 60" (1524mm) is preferred . (+- 3" / 76mm)

8. Other mounting positions and locations are possible; contact factory for any questions regarding this.

### ***Enclosure***

The use of light-tight cabinets and enclosures is the preferred means of preventing exposure. Where it is not practicable to fully enclose the UV source, use screens, shields, and barriers.

**All duct openings needed for mounting and wire routing should be completely enclosed with the use of UL listed gasket rated for operation with UV-C rays, metal covers or equivalent UVC resistant material.**

## CONTROLS

### *Interlocks*

Interlocks should not be tampered with and should be replaced or repaired when defective.

### *Administrative Controls*

Typical administrative controls include limiting access, ensuring that people are aware of the potential hazards, and providing training and safe working instructions for users.

### *Training*

Personnel should be trained in using the UV-generating devices safely. The manufacturer's manuals provide specific safety-related information (type of eye/skin protection needed, ventilation requirements, etc.) that must be completely understood before using the equipment. If any uncertainty or concern exists regarding the safe use of UV-generating devices, contact the manufacturer for clarification. Personnel should carefully study the manufacturer's manuals for the UV-generating devices and be familiar with its use. It is important never to deviate from the instructions for safe operation without first contacting the manufacturer.

At a minimum, lab personnel should be familiar with the following when working with or around UV light:

- UV light-producing equipment
- Warning signs
- Protective equipment
- Symptoms of UV exposure

### *Minimizing exposure*

- Never view the UV lamp directly. Although the inverse square law applies to non-laser-beam UV radiation, it is not advisable to look directly at any UV source (e.g., an arc lamp) – at any distance.
- Keep exposure time to a minimum, and where the source is not enclosed or shielded, keep as far away from it as practicable.
- Restrict access to those personnel who are directly concerned with the operation of the UV source.

## CAUTION

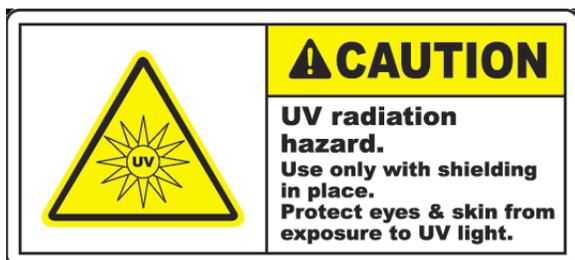
**Overexposure to germicidal ultraviolet rays will result in the irritation of the eyes and reddening of the skin. For this reason, it is of the utmost importance that your ultraviolet application be carefully planned and implemented so as to avoid exposure, of personnel, to direct or reflected ultraviolet rays.**

- The American Conference of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV) for occupational exposure to radiant ultraviolet energy.
- Currently the ultraviolet radiant exposure incident for unprotected eyes or skin should not exceed 0.2 microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ) at 254 nanometers (nm) for an eight (8) hour period.
- Safety and maintenance procedures **MUST** be implemented to prevent accidental exposure of personnel, who maintain the HVAC system. All work performed on the HVAC system must be monitored to ensure that it does not adversely impact the safety or effectiveness of the installation.

## HAZARDS WARNING SIGNS

### *Hazard warning signs*

Warning signs are necessary to inform about the risk of exposure during use and maintenance. Warning signs should be used where applicable to indicate the presence of potential UVC hazards, to restrict access, and to specify PPE.



### *Personal Protective Equipment*

Appropriate PPE includes eyewear, face shields, gloves, and lab coats.

#### *Eyewear*

##### *UV Protective Eyewear*

Use eyewear that is appropriate for the work. Special safety glasses are available for the different UV ranges. For best UV protection, the eyewear should be compliant with ANSI Z87.1 and should have a UV filter marking, *U*, followed by a number on a scale from 2 to 6.

#### *Face shield*

UV-absorbing full face shields should be worn in addition to safety glasses or goggles (goggles may not provide sufficient face protection). Severe skin burns can happen in a very short time, especially under the chin (which is often left exposed).

#### *Gloves*

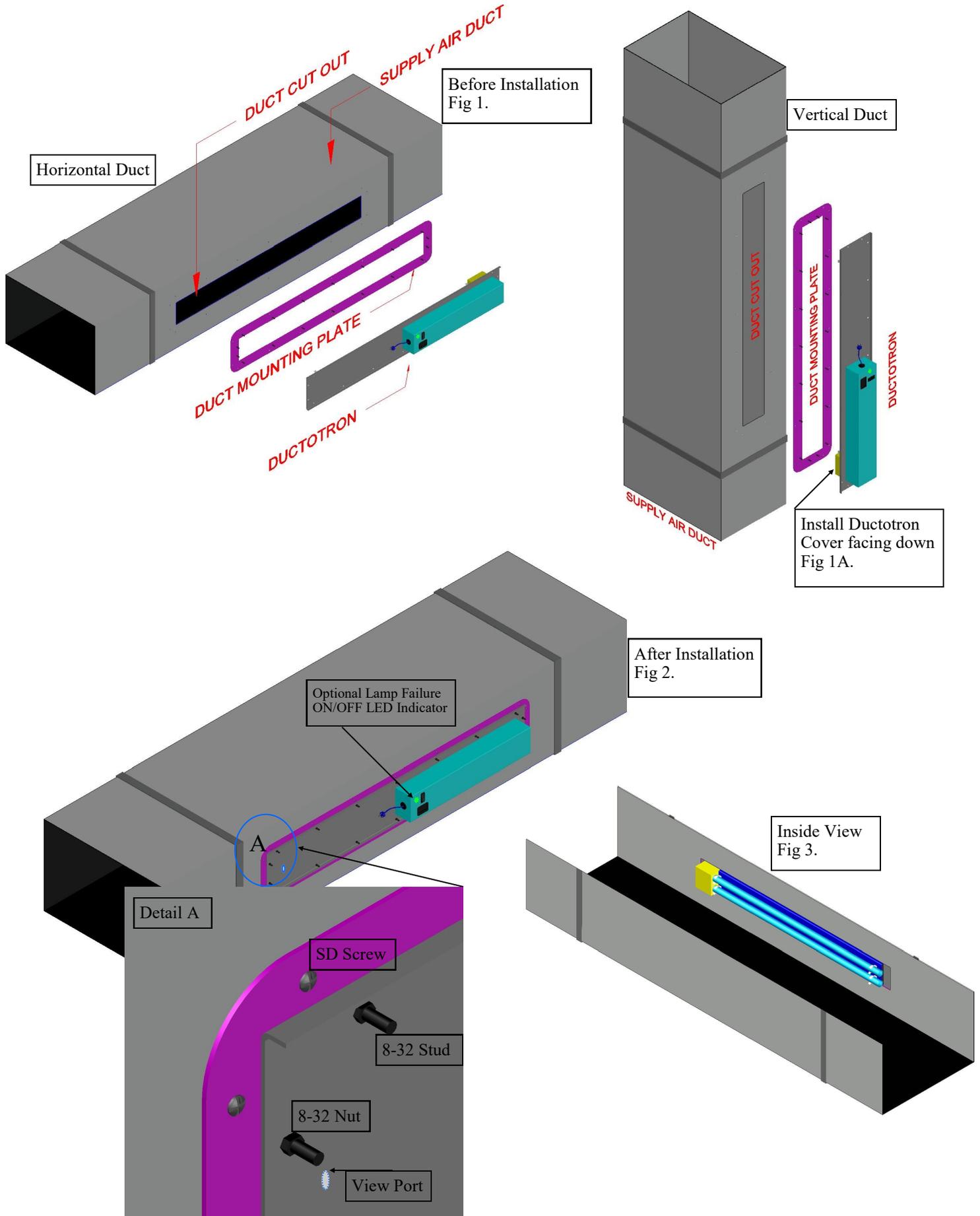
Wear nitrile, latex, or tightly woven fabric gloves to protect against the significant amounts of UV-A and UV-B that may pass through to the skin; these types of gloves have a low transmission of UV compared to vinyl gloves. Gloves should protect personnel from UV light, as well as from the hazard of the activity being performed.

#### *Lab coat*

Personnel should wear lab coats that fasten securely at the wrists and up the neck so that no skin is exposed. Burns to wrists and the neck are not uncommon.

PPE must be either readily available and cleaned between users or personally allocated to each user. Eye and face protection must be inspected either regularly or before each use for damage or defects such as cracks, crazing, or bleaching, and replaced when necessary. Note that PPE may need to serve multiple purposes, such as protecting against both UV and chemical splashes.

**Fig 1,2,3: Typical Installation of DUCTOTRON**



## MOUNTING OF DUCTOTRON

**Installation:** *We strongly encourage a licensed electrician /sheet metal person install this product*, in all locations especially in outdoor areas where weatherproofing may be required. When installing outdoors, consult factory for proper installation guide.

**CAUTION :** Mechanical hazard. Duct sheet metal has sharp edges. Wear protective gloves when working on or around duct sheet metal.

1. Disconnect power to the HVAC system.

2. Mark the center of the duct for horizontal or vertical mount. Place duct mounting plate on the center line, mark the centers of the 18 mounting holes (#8 SD screw provided, *detail A page 8*) and inside edge of the rectangular openings for lamp assembly. For reference, mark any point on the duct for alignment purpose.

Example point A on duct align with B on duct template plate.

**NOTE:** For vertical mount, position frame such that wire cover is at the bottom and dome quartz glass end facing up. See figure 1A page 8

3. Cut out the rectangular openings for lamp assembly. Remove burrs and sharp edges where possible.

**Wear protective gloves when test fitting. DO NOT TOUCH QUARTZ GLASS.**

4. Test fit template to duct. Lamp assembly should pass through rectangular opening, with no interference. Base plate should fit flush to duct and mounting holes of the base plate should be aligned with the center marks (screw holes) on duct.

5. Remove unit from duct; make any adjustments necessary until unit fits correctly.

6. Install duct cut out plate with stud (8-32) facing out. ( *Detail A page 8*)

First apply sealant all around the duct close to the edge of the rectangular cut out to ensure no air leak. Place duct template, align properly and screw it to the duct using factory provided self drilling screws.

7. Clean the outer surface of duct around cutouts for access sealant.

8. Install Ductotron into the duct, align with the mounting hardware locations.

9. Insert No.8-32 nut (provided), mounting hardware into each of the stud total 18 and tighten until gasket is 50% compressed. Further tightening of nuts may be required, if there is any air leak around the frame. (*Detail A page 8*)

10. Finish tightening hardware.

**Note:** If interlocking with air flow switch/motor contactor or air pressure switch, take power source from output to input of Ductotron. See Power requirement for each model. (Page 2)

11. Plug Ductotron into properly grounded, electrical outlet. If unit is supplied without a plug for direct wiring, connect wire leads to appropriate power connections. Install Light-N-lock connector within the control box. All wiring must comply with applicable state, local and national electrical and mechanical codes.

12. Turn on power to the HVAC system.

13. Turn on Miniature Circuit Breaker / Switch on Ductotron.

To verify system is running Ok, view light through view port using proper PPE or optional led lamp ON/OFF indicator. **Note:** *If one lamp fails , led will turn off . If led fails use view port to verify (Detail A page 8)*

Note down hour meter reading for service. Typical Lamp life is rated for this model is (9000-16,000 hrs)

While wearing protective eye wear, inspect HVAC system for any ultraviolet light leakage. No ultraviolet light should be visible from any duct opening, joint, seam, or the unit itself. Use an ultraviolet resistant gasket if needed. The installation should also be inspected, to ensure that the ultraviolet radiant exposure of personnel/occupants is within acceptable limits.

## MAINTENANCE / TROUBLESHOOTING

### WARNING



Always disconnect power to the unit before performing any service or maintenance.

### MAINTENANCE

1. The Ductotron is designed to operate with a minimal amount of maintenance.
2. A regular cleaning cycle of the germicidal lamps and sight glass should be established, and carefully maintained, based on inspection and experience. The frequency of cleaning will vary with the conditions surrounding each installation. It is recommended that the quartz glass be cleaned at least once every three (3) months.
3. The germicidal ultraviolet lamps used in the Ductotron have a manufacturer's rated effective life of between 9000 to 16,000 hours. Lamps may operate longer than the rated effective life, but the reduction in ultraviolet output will make it impractical to use past the manufacturer's rated life. For maximum efficiency lamp replacement is recommended every 9,000 hours of operation or about one (1) year of continuous use.
4. Unless lamp replacement is due to failure or breakage, it is recommended that all lamps be replaced at the same time.

### TROUBLESHOOTING

**WARNING** Use personal protection equipment, such long sleeves with no gaps between cuffs and gloves, and ultraviolet resistant face shield, if troubleshooting Ductotron Unit.

**IMPORTANT:** This unit is to be serviced **ONLY** by qualified, and appropriately trained and/or licensed personnel.

Table 1 – Troubleshooting

| Problem   | Possible Cause  | Corrective Action   |
|---|---|---|
| Not Operating   | <ol style="list-style-type: none"> <li>1. No electrical power.</li> <li>2. Power connection to fixture is loose or disconnected.</li> <li>3. Circuit breaker tripped</li> </ol>   | <ol style="list-style-type: none"> <li>1. Verify that the unit is connected to a live power source.</li> <li>2. Verify power connection to fixture is fully engaged.</li> <li>3. Reset or replace circuit breaker</li> </ol>  |
| Germicidal lamp not operating<br>Lamp Operation View Port/<br>LED Not Lid Up                | <ol style="list-style-type: none"> <li>1. Germicidal lamp(s) not properly seated.</li> <li>2. Germicidal lamp(s) faulty.<br/>(Optional led indication—LED OFF)<br/>Note: If one lamp fails— LED will turn off</li> <li>3. Ballast not functioning.</li> </ol> | <ol style="list-style-type: none"> <li>1. Confirm connection between lamp and lamp holder is tight, and that lamp is making full contact with lamp holder. Replace burn out lamp holder if damage.</li> <li>2. Swap suspected lamp with known good lamp. If known good lamp does not operate, replace ballast.</li> <li>3. Locate the ballast and replace.</li> </ol> |
| Lamp Operation LED Not Lid Up<br><br><b>Note :</b> Wear PPE when checking lamp (s) failure. | <ol style="list-style-type: none"> <li>1. Lamp (s) failed</li> <li>2. LED indicator failed</li> </ol>   | <ol style="list-style-type: none"> <li>1. Check lamp (s) and replace</li> <li>2. Check View Port for blue glow . If blue glow is visible, replace led indicator</li> </ol>  |

Note: LCD Hr meter (hrs & 1/10's) , Run indicator-Blinking decimal point. Reset unit after replacing lamp (s), See label on ductotron

## LAMP REPLACEMENT

### **WARNING:**

Always disconnect power to the unit before performing any service or maintenance.  
Ultraviolet lamps are easily damaged and may cause injury if broken. Exercise care when handling.

### **CAUTION:**

IN ORDER TO PERFORM THIS TASK, BE SURE TO WEAR THE FOLLOWING SAFETY EQUIPMENT. SAFETY GLASSES OR A FACE SHIELD, AS WELL AS GLOVES.

Avoid touching or scratching the glass section of the lamp. Fingerprints weaken the lamp envelope, and this may lead to lamp explosion

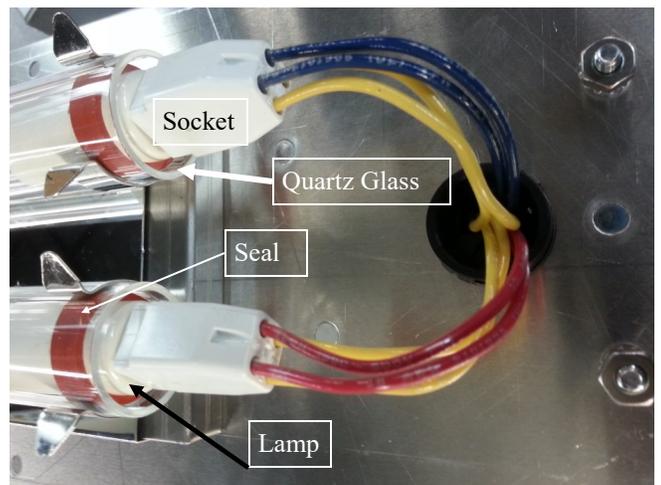
ALWAYS keep the lamp in the provided protective case or cover until installation.



### **Lamp Replacement**

1. Remove 8-32 nut from wire cover.
2. Remove wire cover by sliding carefully out.
2. Disconnect lamp socket from each lamp.
3. Carefully remove burn-out lamp from quartz glass and place them in a protective case for safe disposal.  
*Recommended to change both lamps together.*
4. Remove quartz glass seal from old lamp and insert them into replacement lamp. Do not use damage seal.
5. Install new lamp into quartz sleeve.
6. Reconnect lamp socket and install cover .

Make sure no wire /connector is damage prior to reinstallation.



## Part List:

|  |          |
|--|----------|
| 1. Ballast __ <i>A</i>                           | 230-009  |
| 2. Ballast __ <i>B</i> with <i>LED</i> indicator | 230-201A |
| 3. Ballast __ <i>B</i> without LED indicator     | 230-201  |
| 4. Step Socket Lamp 800mA                        | 230-202  |
| 5. 4P Standard Socket Lamp 800mA                 | 230-202A |
| 6. Step Socket Lamp 425 mA                       | 230-028  |
| 7. Step Socket                                   | 230-110  |
| 8. 4P Standard Socket                            | 230-010  |
| 9. Quartz Glass                                  | 230-023  |
| 10. Seal   | 230-111  |
| 11. Terminal Block                               | 230-029  |
| 12. Cover –mounting screw 8-32                   | 100-017  |
| 13. Mounting Nut 8-32                            | 100-016  |
| 14. Hr meter                                     | 230-089  |
| 15. Circuit Breaker __ <i>1</i>                  | 230-610  |
| 16. Circuit Breaker __ <i>2</i>                  | 210-021  |
| 17. Light-N-LOK 3 pos mated pair plug            | 230-203  |
| 18. Gasket 3/8”Wide                              | 210-091  |
| 19. Clear View Port Plug                         | 230-204  |
| 15. Reflector                                    | 230-102  |

*1* \_ 120 VAC version

*2* \_ 220 VAC version

*A* \_ 425mA lamp ballast (For model 4)

*B* \_ 800 mA lamp ballast with / without led indicator

## GA DRAWING:

Upon Request